



Geologic Time Scale

Geological Survey and Resource Assessment Division fact sheet number 12

6/2002

Missouri Rocks, Types and Uses

On the "geological clock," the age of the earth is represented by the 12 hours on the face of the clock. The sweep of the minute hand around the dial twelve times from 12 to 12 marks the passage of time from the beginning of the earth to today.

At about 4:48, not far from half the earth's age, life first appeared. This is not to be classified as either plant or animal life because it possesses the simple properties of each. You are less likely to speculate enthusiastically about the possibilities of human beings on other planets when you contemplate the vast amount of time required to marshal all of the many and varied factors involved in the simple beginning of the earth. You realize that the likelihood of duplicating the earth's multitudes of environments, in the same order and intensity, on other planets is remote.

At about 10:45 plus 6 seconds, nearly all of the great groups (phyla) of animals were represented by at least a few forms. Even simple vertebrates were probably present although they left no known fossils. For the most part it was only forms that had shells or other hard parts that had a chance to be preserved. When you consider the many forms today that have no hard parts, you realize that fossils alone give a far from complete picture of the past.

At about 11:33 plus 30 seconds, the reptiles started to rule the earth and continued to dominate until the mammals took over. This was the time of the dinosaurs—large and small, including the plesiosaurs, ichthyosaurs, mosasaurs, and pterodactyls. The turtles, crocodiles, snakes, and lizards were also present. This was truly the "Age of Reptiles."

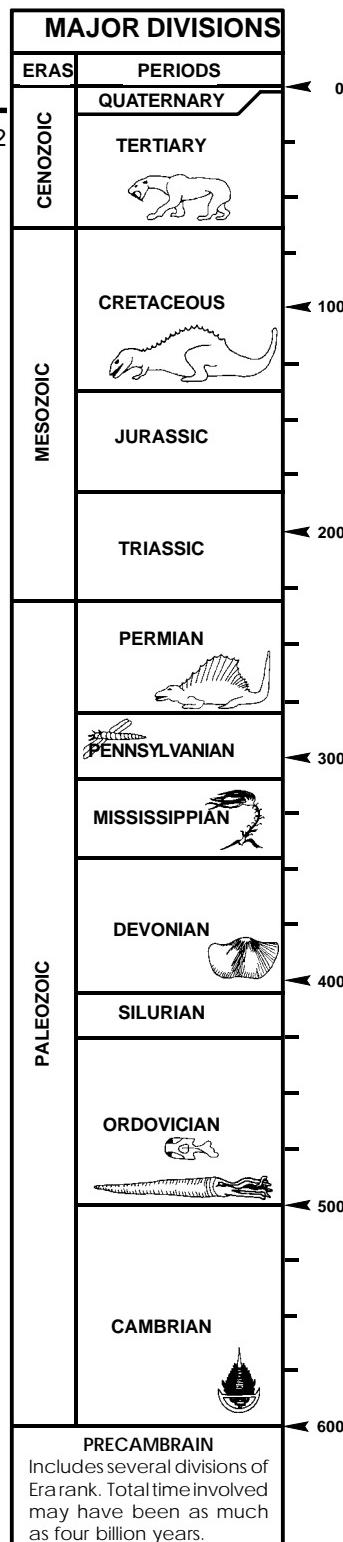
At about 11:51 plus 22 seconds, the great ruling race of reptiles had disappeared, and the mammals had taken over the domination of all environments. Quickly, the big clumsy mammals, which were mostly forest dwellers, took the lead. Modern mammals gradually replaced them as the plains' grasses developed and the forests shrank.

The Pleistocene Epoch started at about 11:59 plus 51 seconds, just 9 seconds ago. There was no evidence of Man in North America this early, however most of the animals found in Missouri today were here, including horses. All of the horses disappeared from North America before the first men arrived, but fortunately the history of this group is written in the rocks of the continent.

Man appeared in North America at about 11:59 plus 59 6/7 seconds, just 1/7 second ago! The climate, plants, and animals were then much the same as they are today. It is likely that some mastodons and possibly elephants, sloths, and peccaries were still to be seen. In Europe, Man had appeared earlier.

--M.G. Mehl

PUB000663



MAJOR DIVISIONS OF GEOLOGIC TIME		TYPES AND DISTRIBUTION	ECONOMIC USES
ERAS	PERIODS		
CENOZOIC	QUATERNARY 0-1 million years ago	Glacial deposits; loess; silt, sand and gravel in modern streams and rivers.	Parent material of much of the state's soil; important sources of water; chief source of sand and gravel.
	TERTIARY 1-64 million years ago	Sand, gravel, clay and shale; largely restricted to Southeastern Lowlands.	Water; ceramic clay; bleaching clay.
MESOZOIC	CRETACEOUS 64-136 million years ago	Clay and sand; restricted to Southeastern Lowlands.	Water; ceramic clay; sand.
	JURASSIC 136-180 million years ago	No rocks in Missouri of Jurassic age.	
	TRIASSIC 180-230 million years ago	No rocks in Missouri of Triassic age.	
PALEOZOIC	PERMIAN 230-280 million years ago	Sandstone; known from single locality in Atchison County.	No economic use.
	PENNSYLVANIAN 280-310 million years ago	Shale, limestone, sandstone, clay and coal; present in more than two-thirds of the state's counties; extensive in western and northern Missouri.	Coal; ceramic materials (including fireclay); limestone and shale for cement manufacture; oil, gas, and water; important source of limestone in many western and northern counties; asphaltic sandstone and iron.
	MISSISSIPPIAN 310-345 million years ago	Predominantly limestone, some shales; principal areas of outcrop are southwestern, central, east-central, and northeastern parts of the state.	Lime, limestone, marble (Carthage), raw material for cement, water, tripoli, lead, zinc and iron.
	DEVONIAN 345-400 million years ago	Predominantly limestone; exposed in central, eastern and southeastern Missouri.	Limestone, marble (Ste. Genevieve County)
	SILURIAN 400-425 million years ago	Predominantly limestone; exposed in northeastern and southeastern Missouri.	Limestone and dolomite
	ORDOVICIAN 425-500 million years ago	Dolomite (magnesian limestone), limestone, sandstone, and shale; extensively exposed in Ozark area as far north as Montgomery County and west to McDonald and St. Clair counties; also exposed in parts of Ralls, Pike, and Lincoln counties.	Sand for glass and ground silica, limestone, dolomite, water, oil (St. Louis County), building stone, raw material for cement, iron and terrazzo chips.
	CAMBRIAN 500-600 million years ago	Dolomite, sandstone and shale; major outcrops restricted to St. Francois Mountains area.	Lead, zinc, silver, cobalt, nickel, copper, barite, iron, water, dolomite, terrazzo chips and building stone.
	PRECAMBRIAN 600 million - 4 billion years ago	Igneous and metamorphic rocks; igneous exposed in St. Francois Mountains area.	Iron; granite (for building and monumental stone, roofing granules; roadstone).